DEPARTMENT OF THE NAVY
SPACE AND NAVAL WARFARE SYSTEMS COMMAND
WASHINGTON, D.C. 20363-5100

SPAWARINST 2450.1
SPAWAR 224-3/4525
12 November 1991

SPAWAR INSTRUCTION 2450.1

From: Commander, Space and Naval Warfare Systems Command

Subj: ELECTROMAGNETIC ENVIRONMENTAL EFFECTS (E^3) CONTROL WITHIN THE SPACE AND NAVAL WARFARE SYSTEMS COMMAND AND WARFARE SYSTEMS OF THE BATTLE FORCE

Ref:
(a) OPNAVINST 2450.2
(b) CNO ltr Ser O9/9U500833 of 17 Mar 89
(c) SD-1, Defense Standardization and Specification Program, Standardization Directory
(d) MIL-HDBK-237
(e) JCS-Pub 1
(f) MIL-STD-463A
(g) OPNAVINST 5000.42C
(h) DOD Directive 5000.2
(i) NTP S-70-8003
(j) DOD Directive 3222.3
(k) MIL-HDBK-235
(l) OPNAVINST 2400.20E

1. Purpose. To implement policy and establish requirements and responsibilities for the control of electromagnetic environmental effects (E^3) in the Space and Naval Warfare Systems Command (SPAWARSYSCOM) cognizant systems and equipment, and among warfare systems within the Battle Force (BF), in accordance with references (a) and (b).

2. Cancellation. NAVELEXINST 2410.3 is hereby cancelled.

3. Scope. The requirements and procedures prescribed by this instruction apply to SPAWARSYSCOM Headquarters and all SPAWARSYSCOM activities that plan, develop, test, procure, lease, construct, modify, install, maintain, and operate SPAWARSYSCOM cognizant electronic and electrical systems, subsystems, and equipment for aerospace, ship, and shore stations, including those intended for the Marine Corps. In addition, this instruction applies to the activities that predict, detect, analyze, and resolve Electromagnetic Interference (EMI) problems with force level impact. The Electromagnetic Environment (EME) of the BF encompasses Joint and Allied Forces as well as the U.S. Navy platforms.

4. Background.

a. The EME has seriously degraded the operational effectiveness of electronic and electrical systems and subsystems including: radar, communication, navigation, command and control, electronic warfare, fire control, sonar, missile guidance systems, etc. Adverse effects have become more evident in modern systems employing increased transmitter power, greater receiver sensitivity, and smaller and more susceptible solid state devices and circuitry. Many types of electrical and mechanical equipment have also been victims since they employ electronic control circuitry.

b. E^3 encompasses many electromagnetic environmental disciplines, including Electromagnetic Compatibility (EMC), Electromagnetic Interference (EMI), Electromagnetic Pulse (EMP), Electronic Counter Countermeasures (ECCM), and Hazards of Electromagnetic Radiation (RADHAZ) to personnel (HERP), ordnance (HERO), and fuels (HERF). Over the years, many E^3 problems have been circumvented by imposing operating restrictions. The collective effect has been to limit operational capability. It thus has become an urgent requirement to identify and correct existing problems and to address potential E^3 problems early in the acquisition cycle to prevent degradation of operational effectiveness.

c. Reference (a) assigns responsibilities for EMC within the Department of the Navy in consonance with policy established by the Secretary of the Navy. In response to reference (a), COMSPAWARSYSCOM has designated SPAWAR 20 as the focal point in the SYSCOMs for force level EMC related engineering interfaces and interdependencies. Reference (b) forwarded the Navy Strategic Plan for EME Management which provides programmatic actions to enhance EMC at all levels.

d. Reference (c) identifies SPAWARSYSCOM as the Lead Service Activity for EMC standardization within the Department of Defense (DOD).

5. Policy

a. Achievement of compatibility in the operational EME is the paramount objective of the Navy EMC Program and will be emphasized in the SPAWAR E^3 Program during the research, development, and acquisition (RDA) and modification processes to minimize the need to correct deficiencies after production. E^3 requirements will be reflected in the System Threat Assessment Report (STAR), Mission Need Statement (MNS), Development Options Paper (DOP), Operational Requirements Document (ORD), Test and Evaluation Master Plan (TEMP), Integrated Program Summary (IPS), Statements of Work (SOW), Specifications, and Data Requirements. Requests for waivers, deviations, and engineering change proposals (ECP) for E^3 requirements shall be submitted via OP-094 to ASN(RDA) for approval only after due consideration of the impact on operational capability.

b. The SPAWARSYSCOM and all activities, projects, program offices, laboratories, and facilities therein, are accountable individually for the application and enforcement of E^3 requirements within their respective areas of cognizance.

c. In satisfying requirements for EMC analysis and prediction, and in consonance with references (a) and (b), the facilities of the DOD Electromagnetic Compatibility Analysis Center (ECAC) will be used to the maximum practical extent and will not be unnecessarily duplicated.

d. Provisions for frequency supportability and for achieving and maintaining E^3 control in platforms, systems, and equipment, including shore stations, will be incorporated during the life cycles of all SPAWAR product line items. Approval to proceed to subsequent phases of development will not be granted by the SPAWAR Acquisition Review Board (ARB) until acceptable compliance with the intent of spectrum management and E^3 control requirements has been demonstrated in ongoing or completed phases and all problems have been resolved. Continuing non-resolution of a problem will cause that problem to become an issue before the ARB.

e. E^3 deficiencies which have the potential to degrade performance in the operating forces will be resolved expeditiously.

f. In the area of joint operations that include the resources of the other Services or Allied operations involving International agreements and treaties, such as, the North Atlantic Treaty Organization (NATO), there must be EMC within the BF. Requirements for Joint and Allied programs will be monitored to ensure EMC. Joint service program requirements will be reviewed per reference (d) procedures. Equipment and systems developed for use on a noncognizant platform or facility will conform to the environment established for that platform or facility.

6. Definitions. E^3 terms are defined in references (a), (b), (e), and (f).

7. Responsibilities

a. The SPAWAR E^3 Branch, SPAWAR 224-3 of the Engineering Standards Division, is designated the Command's EME control policy, coordination, and oversight office with sign off concurrence authority for E^3 matters affecting Warfare Systems Engineering, RDA, and the Fleet Modernization Program (FMP) Programs under the cognizance of SPAWAR. The responsibility includes the establishment and maintenance of an engineering capability for detecting, measuring, analyzing, reporting, preventing, and correcting E^3 deficiencies.

b. Reference (c) designates the Navy as the Lead Service for the EMC Standardization Area under the Defense Standardization and Specification Program and SPAWAR is designated the Lead

Service Activity representative responsible for the development/control of EMC standardization projects and associated program planning for DOD.

c. SPAWAR Program Managers, Warfare (PMW) have overall cradle-to-grave performance and logistic responsibilities for the acquisition of systems, subsystems, and equipment under SPAWAR cognizance. The responsibility includes preventing and eliminating the harmful effects of the EME in their programs.

8. Action

a. SPAWAR 224-3 shall:

(1) Assist PMWs to avoid, resolve, and correct E^3 deficiencies throughout the life cycle of their equipments, systems, and platforms.

(2) Coordinate with other SYSCOMs and PMs to resolve and correct inter-platform deficiencies due to E^3.

(3) Provide guidance and assistance during operational requirements generation and during the development cycle in the application of the Warfare Systems Acquisition E^3 Control Strategy (WSECS) for BF E^3, and Acquisition E^3 Control Strategy (AECS) for SPAWAR product line acquisitions. Provide the objectives, evaluation criteria, and identify key documents associated with the AECS as they relate to each phase of the acquisition cycle. WSECS and AECS establish E^3 control criteria which must be satisfied at each stage of development.

(4) Review for concurrence RDA documents for equipments, systems, and platforms per references (g) and (h) in terms of spectrum support and E^3 impact on combat operations. Resolve all in house problems with appropriate PMWs, referring problems that persist to the SPAWAR Systems Engineering Board (SSEB) for resolution. Non-SPAWAR problems that cannot be resolved with the assistance of the PMs will be referred to the Force Warfare Systems Engineering Board (FWSEB) for resolution. If resolution cannot be made, forward reports of predicted mission degrading E^3 problems with new systems, identifying both the potential source and the victim systems and the possible effect on operations, to OP-07, via the EME Management Program Coordinator (OP-094), for resolution by the Warfare Requirements Board (WRB). Requests that relax E^3 requirements shall be forwarded to ASN (RDA) for approval. Alert OP-091, via OP-094, of limitations and deficiencies noted in TEMP statements on operational suitability in the EME and the criteria to be used in assessments.

(5) Perform analyses of waiver requests relating to E^3 requirements and submit to SPAWAR 20 for action as waiver authority in accordance with paragraph 8.b., below. Ensure waiver response letters are included in the contract files subject to review by the Naval Inspector General.

(6) Establish BF E^3 databases to contain current and accurate information on the status of E^3 related requirements for Navy and joint programs. The databases should be centrally accessible for periodic oversight review by the EME Management Program Coordinator (OP-094) and should include information concerning:

(a) System compliance with E^3 related requirements.

(b) Documented approval of waivers of, and deviations from, E^3 related requirements.

(c) Status of correction of E^3 deficiencies in the fleet, including projected completion dates.

(7) Prepare, maintain, and execute a SYSCOM Implementation Plan for reference (b), updating it biennially.

(8) Develop and issue, publish, or provide for respective areas of responsibility, definitions of the EME consistent with the SPAWAR definition of the force wide EME. Develop and promulgate standards, specifications, data item descriptions (DID), and handbooks for achievement and maintenance of EMC in cognizant systems, platforms, and facilities, consistent with the DOD EMC Standardization Program.

(9) Provide E^3 training for design, acquisition, and test personnel assigned to engineering duties at headquarters and subordinate activities to detect, measure, analyze, report, and correct degradation of cognizant systems, platforms, or facilities due to E^3. Incorporate training requirements into reference (i).

(10) Provide quick response to investigate, scope, and recommend solutions for BF E^3 degradation reported by the fleet or shore facilities involving SPAWAR cognizant equipment, systems, and facilities.

(11) Review for E^3 concurrence Proposed Military Improvements, Proposed Technical Improvements, and Justification/Cost Forms relating to the FMP.

(12) Provide a representative to a staff level EMC Coordinating Committee sponsored by OP-094. The committee shall meet at the call of the chairperson, at least quarterly, to review mutual projects and issues, to coordinate the resolution and correction of mutual E^3 deficiencies, and to provide a semiannual status report to the WRB.

(13) Provide the focal point in the SYSCOMs for engineering interfaces and interdependencies related to force level E^3. Provide the definition of the force level EME. Coordinate with the SYSCOM's product line management and the Naval Facilities Engineering Command (NAVFACENGCOM) to ensure consistency and

effectiveness in their application of provisions for achieving force level E^3 control. Coordination with NAVFACENGCOM is accomplished by reviewing Station Master Plans, Base Electronic Systems Engineering Plans (BESEPs), and Requests for Site Approvals and advising on E^3 matters.

(14) Develop a capability to quantify the impact of degradation on force level warfighting capability due to E^3.

(15) Review and provide technical recommendations to OP-094 on requests for frequency allocation and for waivers and deviations of E^3 related requirements.

(16) As Lead Service Activity for the EMC Standardization Area under the Defense Standardization and Specification Program develop and maintain in accordance with reference (j) a coordinated plan to provide current and contractually enforceable EMC military standards. Coordinate and program funds for the development and updating of EMC dedicated engineering standards, specifications, and handbooks.

(17) Provide related staff support to the EME Management Program Coordinator (OP-094).

b. SPAWAR 20

(1) Exercise waiver authority for E^3 related requirements for variances which do not affect warfighting capability.

(2) For waiver requests impacting warfighting capability, forward requests, with impact analyses including force level effectiveness, to OP-094 for approval. Waiver and deviation requests and ECPs submitted during the acquisition process that relax E^3 requirements for a given system/equipment shall be forwarded through OP-094 to ASN (RDA) for approval.

c. SPAWAR PMWs shall:

(1) Plan and program funds to prevent and correct E^3 degradation deficiencies. Enforce E^3 management and degradation control procedures during the development, procurement, modification, operation, and maintenance of systems and equipment under SPAWAR cognizance, to ensure compatible operation in the EME. Project budgets will include line items for E^3 management initiatives such as preparation of Application for Equipment Frequency Allocation (DD 1494) and support of EMC Advisory Boards (EMCABs).

(2) Prepare an Electromagnetic Compatibility Program Plan (EMCPP) as required by reference (a). Plans shall be updated as the program progresses through the various phases of development. All plans and revisions shall be provided to SPAWAR 224-3 for review. Final plans shall also be provided to SPAWAR 224-3.

(3) Conduct a thorough E^3 analysis of proposed new developments or of new applications of existing developments prior to a Milestone 0, Concept Studies Approval to proceed with Concept Exploration and Definition; Phase 0 of the Acquisition Process. The analysis shall be updated for succeeding decision milestones and follow on procurements. Subject nondevelopment items (NDI), proposed for procurement, to a thorough E^3 analysis in the proposed operational EME prior to major procurement decisions, and limit initial procurement quantities to the minimum necessary for test and evaluation to certify E^3 acceptibility .

(4) Establish an EMCAB, and employ it throughout the acquisition cycle for all ACAT I and II programs and other programs designated by SPAWAR 224-3 that will affect, or be affected by, the EME.

(5) Include E^3 control requirements and provisions for meeting those requirements in all program planning and acquisition documents; such as, Acquisition Plans, Program Plans, TEMPs, SOWs, Specifications, and Data Requirements. Copies of such documents shall be provided to SPAWAR 224-3 for review to ensure that control of E^3 is properly addressed.

(6) Subject all electronic system and equipment developments to a thorough E^3 analysis during development to ensure EMC in their intended operational environment. Prediction and analysis for E^3 shall be applied in the conceptual phases of developments to avoid more costly research or experimentation. The operational EME shall be determined as a preface to analysis and prediction and the establishment of parameters for systems and equipment development. Reference (k) shall be employed to determine the environments which may be encountered.

(7) Include E^3 control considerations in deviation, waiver, and ECP reviews in the course of developing and procuring systems and equipment. Requests for waivers, deviations, and ECPs shall be subject to concurrence by SPAWAR 224-3, for E^3 control impact. Requests for waivers effected by Federal or International criteria will be forwarded via 224-3 to the Chief of Naval Operations (CNO) OP-094, for approval. The ultimate authority for approval of waivers, deviations, and ECPs that relax E^3 requirements during the acquisition process is the ASN (RDA).

(8) Prepare, update, and submit to OP-094 applications for equipment Frequency Allocation (DD 1494), in accordance with reference (l). Requests for allocations will be submitted through SPAWAR 224-3 to CNO (OP-094). Assistance in preparation of requests may be obtained from SPAWAR 224-3. Allocation requests must be submitted in time to receive approval before committing funds for

development and/or procurement of equipment or systems. Any parameters in a frequency allocation request not in accordance with applicable requirements must be accompanied by a request for a waiver. System parameters specified in the frequency allocation must be included as minimum systems requirements in contractual documentation. Limitations and restrictions identified in frequency allocations will be stated in technical and operational manuals.

(9) Tailor approved E^3 specifications and standards to the design, development, and acquisition of systems and equipments using the guidance, methodology, and assistance provided by SPAWAR 224-3.

(10) Ensure that systems and equipments developed for the Marine Corps meet requirements for the control of E^3.

d. SPAWAR 02 shall not award contracts for development or procurement of transmitting or receiving electronic equipment or systems without a frequency allocation approval from CNO.

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